Software Product Description

PRODUCT NAME: DECnet/E, Version 2.1 **SPD 10.73.08**

DESCRIPTION

DECnet/E is a Phase III network product that allows a suitably configured RSTS/E system (at least at Version 9.0) to participate as a routing or nonrouting (end) node in DECnet computer networks. DECnet/E is warranted for use only with supported Phase III and Phase IV DECnet products supplied by DIGITAL.

DECnet/E offers task-to-task communications, homogenous network command terminals, network file transfer, multipoint line support, and adaptive routing using the DIGITAL Network Architecture (DNA) protocols. DECnet/E communicates with adjacent and nonadjacent Phase III and Phase IV nodes. Direct connections to Phase II nodes are not supported. Adjacent nodes control opposite ends of a point-to-point communication line or are in a master-slave relationship on a multipoint line. DECnet/E functions are available to RSTS/E user programs written in BASIC-PLUS, BASIC-PLUS-2, FORTRAN IV, FORTRAN-77, PDP-11 COBOL, COBOL-81, or MACRO-11.

DECnet/E is a Phase III product; direct connection to an Ethernet based Local Area Network (LAN) is not supported. DECnet/E nodes may access, or be accessed by, Phase IV LAN nodes via a Router Server or via Phase IV routing nodes on the LAN.

The network functions available to a DECnet/E user depend, in part, on the configuration of the rest of the network. Each DECnet product offers its own functions and its own set of features to the user. Networks consisting entirely of DECnet/E Phase III nodes have all the functions described in this SPD. Networks that combine DECnet/E nodes with other DECnet products can limit the functions available to the DECnet/E user since some DECnet/E features may not be supported by all DECnet products. Conversely, a user of another DECnet implementation will not necessarily have access to all DECnet/E functions.

The DECnet products and functions available to users on mixed networks can be determined by comparison of the SPDs for the appropriate products.

Adaptive Routing

DECnet/E nodes function as routing nodes when multiple circuits are in use. A message received from a Phase III or Phase IV node addressed to another Phase III or Phase IV node will be forwarded by intermediate routing nodes. Routing of Phase IV messages is restricted to Phase III routing limitations. Phase III DECnet/E must not be configured as an intermediate routing node between Phase IV nodes.

DECnet/E Phase III routing permits the implementation of networks to a maximum of 255 nodes. To achieve adequate performance, significant network analysis should be completed prior to any network implementation. The size limitation of any individual network will vary based on specific products and configuration.

Although two adjacent routing nodes can be connected by more than one single physical link, messages will be sent over only one of the links. All other lines will serve as "hot standbys", such that the least cost path available between two nodes is the one that will be used for message traffic. A line cost parameter set by the system manager determines the line over which all messages will be sent from node to adjacent node.

DECnet/E may be configured as an end node. A nonrouting (end) node has only one line that must be connected to another Phase III or Phase IV node. A nonrouting node can send messages to and receive messages from other nonadjacent Phase III or Phase IV network nodes; however, it does not route through transit messages to other nodes.

Since end nodes do not route messages, they do not need to store or update routing data bases. Consequently, end nodes initiate less overhead message traffic than routing nodes. For the same reason, end node operation uses less memory and less processing power then routing node operation.

Task-to-Task Communication

Using DECnet/E, a RSTS/E user program written in BASIC-PLUS, BASIC-PLUS-2, FORTRAN IV, FORTRAN-77, PDP-11 COBOL, COBOL-81, or MACRO-11 can exchange messages with other user programs via DECnet protocols. The two user programs can be on the same node, or any two connected Phase III or

digital software

May 1985
AE-D427I-TC

Phase IV nodes. The DECnet messages sent and received by the two user programs can be in any data format. Each message segment can be up to 568 bytes long, including all overhead through the transport layer (less if limited by capabilities of the communication line or the remote DECnet node). By segmenting messages, user programs can send any size message.

Network Resource Access

File Transfer Utilities

Using DECnet/E utilities, a user can transfer sequential ASCII files between DECnet nodes. With minor restrictions, RSTS/E RMS files can be transferred between DECnet/E nodes.

Non-ASCII files can be transferred when formats between the DECnet nodes are compatible. Between two DECnet/E systems, for instance, sequential RMS files can be transferred in either block or record mode with attributes preserved. (Record size must be less than or equal to 512 bytes for record-mode transfer.) Indexed files can be transferred in block mode and remain fully RMS compatible. When executable files are transferred, the run-time system name and executability are preserved.

The DECnet/E file transfer utilities support all RSTS/E RMS supported devices and file formats. Note that RMS does not support DOS-11 label format magnetic tapes. RMS supports only F and D record formats on ANSI label format magnetic tapes.

Additional facilities allow batch command files to be submitted to a remote node via the SUBMIT command. The list of commands must be in the format expected by the node responsible for the execution. DECnet/E also allows batch files to be received from other systems and executed, provided the batch files are in a record format acceptable to RSTS/E BATCH.

Additional commands supported are DIRECTORY, APPEND (to existing output files of sequential organization), and DELETE. RSTS/E asterisk/format wild cards are accepted with any of these commands, including COPY, PRINT, and SUBMIT.

DECnet/E does not support network file spooling; however, print files can be copied to a remote line printer spooler via the PRINT command.

Media Copy Utility

A NETCPY utility is provided, which uses network communications, to copy RK05 disks, flexible diskettes, DECtapes, and magnetic tapes from one DECnet/E node to another DECnet/E node. The user's node must be either the source or destination node for the copy. The copy must be done without breaks and between like peripheral devices. NETCPY is similar to the RSTS/E COPY utility in operation and capability. The entire medium is copied, and copy operations are non-file-structured. NETCPY does not provide recovery from bad disk blocks and is not intended for copying RL01 or larger disks.

Record Level Access to Files

Record level access to RMS sequential, relative, and indexed files is supported on local or remote systems through use of the FAL program. Supported RMS operations are:

CREATE
ERASE
OPEN
CONNECT
DISCONNECT
CLOSE
GET (Keyed or Sequential)
UPDATE
PUT (Keyed or Sequential)
DELETE RECORD
FREE
FLUSH
FIND (Keyed or Sequential)

RMS operations which are not supported by FAL are:

PARSE
SEARCH
ENTER
REMOVE
RENAME

Network Command Terminal

The NET utility allows users to log into and run programs on remote DECnet/E systems. This connection makes the terminal appear as if it were physically connected to the other system; the operator can use all the standard system and network utilities. As normally used, keystrokes are echoed locally and input is buffered, but not all features of the RSTS/E terminal service are supported. A special mode is also provided that allows keystrokes to be echoed by the remote system; this mode allows interaction with a program (on a remote node) that processes terminal input on a keystroke-by-keystroke basis.

This utility is particularly useful for doing remote program development and allows terminal users on small application-oriented systems to utilize the resources of larger development-oriented systems.

DECnet/E also provides an unsupported utility that allows a terminal user to log onto and run programs on a remote system such as DECnet-VAX. This utility is provided only as a courtesy from DIGITAL; there are no implied support services for this utility as in the case with other DECnet/E capabilities mentioned.

Network Management

The Network Control Program (NCP) performs three primary functions: it allows users to display statistical and error information, control network components, and test network operation. These functions can be performed locally or executed at remote Phase III or Phase IV nodes that support these functions.

An operator can display the status of DECnet activity at the local node and at other Phase III or Phase IV nodes in the network. The user can choose to display statistics related to the node itself or the communication lines, including traffic and error data. The local operator can also perform many network control functions, such as starting and stopping circuits and activating the local node.

DECnet/E provides local and remote network event logging to a terminal device, monitor program or disk file. The NCP utility can be used to enable and disable the event logging facility.

NCP can also be used to perform a logical series of tests to isolate network problems. NCP enables transmission and reception of test messages over individual circuits either between nodes or through other loopback arrangements. The messages can then be compared for possible errors.

Some network management features incorporated in Phase IV, e.g., recognition of more than 255 nodes will not be accessible to users of Phase III DECnet/E.

Terminal Communication Utility

The DECnet/E TLK utility allows a user on a DECnet/E node to send messages to DECnet/E nodes that support the complementary feature, LSN. Messages can be directed to a specific terminal or to the operator's console at the destination node. TLK dialog mode allows users on the two systems to establish a conversation and send messages to one another without the need to enter addressing information with every message.

Communications

DECnet/E supports the DIGITAL Data Communications Message Protocol (DDCMP) for full- or half-duplex transmission in point-to-point and multipoint operation using serial synchronous facilities. DDCMP provides error detection/correction (by retransmission) and physical link management facilities. In addition, an auto-answer capability is provided. The auto-answer function is supported with EIA-type devices only.

The maximum number of circuits that can be supported by a DECnet/E node is sixteen, depending on the type of CPU, type of communications interface, and speed of interfaces.

DECnet/E multipoint will support up to a maximum of sixteen tributaries on a single multipoint control node. The communication path to each tributary counts as a circuit with respect to the limits on the number of circuits specified above.

DECnet/E uses DMC11, DMR11, DMV11 or DMP11 communications controllers to interface with other network nodes. The DMC11, DMR11, and DMP11 are Direct Memory Access (DMA) UNIBUS peripherals (DMV11 is a DMA QBUS peripheral) which implement line control and error recovery procedures in microcode. These devices use the DIGITAL Data Communications Message Protocol (DDCMP) to provide full- or half-duplex communication over point-to-point synchronous lines. The DMP11 can be used as either a master station or a tributary in a multipoint configuration where UNIBUS-based CPUs are used. The DMV11 can be used similarly in QBUS-based CPUs for multipoint communication. The DMP11, DMR11, and DMV11 can be used in point-to-point communication configurations either in DMC11 compatibility mode or in the current DDCMP, Version 4.1 compatible mode.

DECnet/E Operation

RSTS/E memory requirement is a minimum of 124K words (248K bytes).

DECnet/E utilities require up to 28K words (56K bytes) of user memory when resident. The file transfer utilities require the RSX Run-Time System, and can be built to use the RMS resident library to reduce user memory requirements. The Network Management utilities and the Network Command Terminal program use the RSX Run-Time System. All other utility programs require either a BASIC-PLUS Run-Time System, or the CSPCOM compiler to use the RSX Run-Time System.

DECnet/E Configuration and Performance

The process of configuring a DECnet/E node is based primarily on trade-offs of cost, performance, and capability, while satisfying the user's application requirements. Network applications range from low-speed, low-cost situations to those of relatively high performance and capability. The performance of a given DECnet/E node is a function not only of the expected network traffic and resultant processing activities (global conditions), but also of the amount of concurrent processing activities (local conditions) specific to that node. Among the factors which influence node performance are:

- CPU type
- Number of device interrupts per unit time
- Communication line characteristics
- Number and size of buffers
- Message size and frequency of transmission
- "Local" applications
- Amount and frequency of route-through traffic

Note that the rate at which user data can be transmitted (throughput) over a communications line can sometimes approach, but will never exceed, the actual line speed. The actual throughput is a function of many factors, such as the line quality, protocol overhead, topology (end node or routing node) and network application(s), and the factors listed above.

Refer to the tables below for multipoint configuration guidelines and maximum system configuration information.

How to use these tables:

The tables below describe the physical hardware configurations supported by DECnet/E in terms of CPU type and communications interface. The numbers given in the tables are "load costs".

The maximum system configuration, with a mix of device types, is computed by adding the load costs (in load units) for each device up to the limit for a given processor type.

Example:

When configuring a PDP-11/34 system (load limit: 12) running DECnet/E in a DECnet network: If the system uses one DMP at 56 kilobits/second as multipoint controller node (load cost: 8) and one DMR at 19.2 kilobits/second (load cost: 2) it would be inadvisable to add any device with a load limit greater than two units.

CPU	Maximum Load (in Load Units)
PDP-11/23-PLUS, MicroPDP-11/23	8
PDP-11/24	8
PDP-11/34	12
PDP-11/44, PDP-11/70 MicroPDP-11/73	16

LOAD UNITS PER DEVICE AT SPEEDS SHOWN (when device is in active use)

	Line Speed (Kilobits/second)					
	9.6	19.2	56	250	500	1000
Device Type						
DMV11	1	2	4	n/a	n/a	n/a
DMP11	1	2	4	8	8	16*
DMC11	1	2	4	n/a	n/a	16
DMR11	1	2	4	8	16	16

* Half-duplex only

Maximum throughput for a specific tributary node is equal to the maximum aggregate data rate for the control node, divided by one plus the number of active tributaries.

In order to achieve a viable configuration, the user and/or a DIGITAL software specialist must perform some application analysis, which addresses the parameters stated above. In the preceding tables, the following definitions apply:

Maximum Line Speed—The fastest clock rate at which the number of devices specified can be driven under DECnet/E. The actual maximum data throughput cannot be calculated by multiplication of the number of lines by the line speed, since many factors already discussed in the section will reduce the actual throughput.

PREREQUISITE SUPPORT PLAN

A Network Profile and DECnet Customer Support Plan covering all intended network nodes and their support may be required.

MINIMUM HARDWARE REQUIRED

Any valid RSTS/E system configuration which supports RMS with:

- A minimum of 124K words (248K bytes) of parity or ECC user memory
- PDP-11/23-PLUS or MicroPDP-11/23 through PDP-11/70 or MicroPDP-11/73 central processor and DD11-B, -C, or -D system interface unit with one of the following communication devices (point-to-point or multipoint):

Point-to-Point Devices

DMC11-AR, -DA+

V.24/EIA RS-232-C (maximum 19.2 kilobits/second) remote synchronous interface

DMC11-AL, -MD+

High speed local synchronous interface. The maximum data rate is 56 kilobits/second.

DMC11-AL, -MA+

High-speed local synchronous interface. The maximum data rate is 1000 kilobits/second.

DMC11-AR, -FA+

CCITT V.35 synchronous communication interface. Maximum data rate up to 250 kilobits/second.

DMR11-AA (DMR11-AP or DMR11-M/CK—DMR11-A*)

V.24/EIA RS-232-C (maximum 19.2 kilobits/second) remote synchronous interface

DMR11-AC (DMR11-CP or DMR11-M/CK—DMR22-C*)

High-speed local synchronous interface with integral modem (switch-selectable speeds: 56, 250, 500, or 1000 kilobits/second) for local connection.

DMR11-AB (DMR11-BP or DMR11-M/CK—DMR11-B*)

CCITT V.35 synchronous communication interface. Maximum data rate up to 56 kilobits/second (clocked by modem)

DMR11-AE (DMR11-EP or DMR11-M/CK—DMR11-E*)

EIA RS-422 synchronous communication interface. Maximum data rate up to 1,000 kilobits/second (clocked by modem)

Point-to-Point or Multipoint Devices

DMV11-AA (DMV11-AP or DMV11-M/CK—DMV11-A*)

EIA RS-232-C (maximum 19.2 kilobits/second) synchronous communications interface for QBUS-based CPUs.

DMV11-AA (DMV11-FP or DMV11-M/CK-DMV11-F*)

EIA RS-423 (up to 56 kilobits/second) synchronous communications interface for QBUS-based CPUs.

DMV11-AB (DMV11-BP or DMV11-N/CK—DMV11-B*)

CCITT V.35 synchronous communications interface for QBUS-based CPUs. The maximum data rate is 56 kilobits/second.

DMV11-AC (DMV11-CP or DMV11-N/CK—DMV11-C*)

Local synchronous communications interface with integral modem for QBUS-based CPUs. The data rate is 56 kilobits/second.

DMP11-AA (DMP11-AP or DMP11-M/CK—DMP11-A*)

EIA RS-232-C (up to 19.2 kilobits/second) or RS-423-A (up to 56 kilobits/second) synchronous communication interface for UNIBUS-based CPUs.

DMP11-AA (DMP11-FP or DMP11-M/CK-DMP11-F*)

EIA RS-423 (up to 56 kilobits/second) synchronous communications interface for UNIBUS-based CPUs.

DMP11-AB (DMP11-BP or DMP11-M/CK—DMP11-B*)

CCITT V.35 synchronous communication interface for UNIBUS-based CPUs. The maximum data rate is 56 kilobits/second.

DMP11-AC (DMP11-CP or DMP11-M/CK—DMP11-C*)

Local synchronous communication interface for UNIBUS-based CPUs with integral modem (switch selectable speeds: 56, 250, 500 or 1000 kilobits/second. The maximum data rate is 500 kilobits/second (FDX) or 1000 kilobits/second (HDX).

DMP11-AE (DMP11-EP or DMP11-M/CK—DMP11-E*)

RS-422-A Remote synchronous communication interface for UNIBUS-based CPUs. The maximum data rate is 1000 kilobits/second.

† The DMC11 is no longer available from DIGITAL and may not be supported in future releases.

* Cab-kit for field upgrade: variant will depend on CPU in which it will be installed.

Note: The following RS-422/423 signals are not supported by the DECnet/E or RSTS/E software:

NS — New Synch
SR — Signaling Rate Selector
LL — Local Loopback
RL — Remote Loopback
SS — Select Standby

OPTIONAL HARDWARE

Additional communication devices from the above up to the maximum defined in the Configuration and Performance section of this SPD.

PREREQUISITE SOFTWARE

RSTS/E Operating System

Refer to the RSTS/E Optional Software Cross Reference Table (SPD 20.97.xx) for the required version.

OPTIONAL SOFTWARE

None

SOFTWARE WARRANTY

Warranty for this software product is provided by DIGITAL with the purchase of a license for the product. There is no additional charge. This software product is warranted to conform to the Software Product Description (SPD). This means that DIGITAL will remedy any nonconformance when it is reported to DIGITAL by the customer during the warranty period.

The warranty period is ninety (90) days. It begins when the software is installed or thirty (30) days after delivery to the end user, whichever occurs first and expires ninety (90) days later. All warranty related support for this software will end 180 days after release of the subsequent version.

Warranty is provided in the country of purchase. DIGITAL will provide a service location which will accept reporting (in a format prescribed by DIGITAL) of a nonconformance problem caused when using the licensed software under normal conditions as defined by the SPD. DIGITAL will remedy a nonconformance problem in the current unaltered release of the licensed software by issuing correction information such as: correction documentation, corrected code, or notice of availability of corrected code; or a restriction or a bypass. The customer will be responsible for the preparation and submission of the problem report to the service location.

Warranty Exclusion

DIGITAL DOES NOT WARRANT THAT THE SOFTWARE LICENSED TO CUSTOMER SHALL BE ERROR FREE, THAT THE SOFTWARE SHALL OPERATE WITH ANY HARDWARE AND SOFTWARE OTHER THAN AS SPECIFIED IN THIS SPD, THAT THE SOFTWARE SHALL SATISFY CUSTOMER'S OWN SPECIFIC REQUIREMENTS, OR THAT COPIES OF THE SOFTWARE OTHER THAN THOSE PROVIDED OR AUTHORIZED BY DIGITAL SHALL CONFORM TO THE SPD.

DIGITAL MAKES NO WARRANTIES WITH RESPECT TO THE FITNESS AND OPERABILITY OF MODIFICATIONS NOT MADE BY DIGITAL.

IF THE SOFTWARE FAILS TO FUNCTION FOR REASONS STATED ABOVE, THE CUSTOMER'S WARRANTY WILL BE INVALIDATED AND ALL SERVICE CALLS WILL BE BILLABLE AT THE PREVAILING PER CALL RATES.

INSTALLATION

Customer Responsibilities

Before DIGITAL can install the software, the customer must:

- Ensure that system meets the minimum hardware and software requirements (as specified in the SPD).
- Obtain, install and demonstrate as operational any modems and other equipment and facilities necessary to interface DIGITAL's communication equipment.
- For multi node networks designate one adjacent node to verify installation/connectivity.
- Make available for a reasonable period of time, as mutually agreed upon by DIGITAL and the customer, all hardware communication facilities and terminals that are to be used during installation.

Delays caused by any failure to meet these responsibilities will be charged at the prevailing rate for time and materials.

Only experienced customers should attempt installation of this product. DIGITAL recommends that all other customers purchase DIGITAL's Installation Services. These services provide for installation of the software product by an experienced DIGITAL Software Specialist.

DIGITAL's Installation Services can be purchased as a separate service.

ORDERING INFORMATION

Single-Use licensed software is furnished under the licensing provisions of DIGITAL's Standard Terms and Conditions of Sale, which provide in part that the software and any part thereof may be used on only the single CPU on which the software is first installed, and may be copied, in whole or in part (with the proper inclusion of DIGITAL's copyright notice and any proprietary notices on the software) for use on such CPU.

You will need a separate license for each CPU on which you will be using the software product (except as otherwise specified by DIGITAL). Then you will select the Materials and Service Options you need to utilize the product effectively. **IF YOU ARE ALREADY FAMILIAR WITH THESE OPTIONS, YOU MAY OBTAIN THE ORDERING INFORMATION DIRECTLY FROM THE SOFTWARE OPTIONS CHART.** In most cases, you will want to review the following descriptions to determine what options you require.

LICENSE OPTIONS

Single-Use License Option

The Single-Use License is your right to use the software product on a single CPU and it includes your 90 day warranty.

For your first installation of this software product you must purchase as a **minimum:**

- Single-Use License Option, and
- Distribution and Documentation Option

The license gives you the right to use the software on a single CPU and the Distribution and Documentation Option provides the machine-readable software and related documentation.

To use this software product on additional CPUs, you must purchase for each CPU as a **minimum:**

- Single-Use License Option

In addition to the right to use, the license gives you the one-time right to copy the software from your original CPU installation to the additional CPU. Therefore, the Distribution and Documentation Option is not required, but optional.

MATERIALS AND SERVICE OPTIONS

Distribution and Documentation Option

The Distribution and Documentation option provides the machine-readable software in binary form and the basic documentation. You must have, or order, a Single-Use License to obtain this option. You will need this option to install the software for the first time. When revised versions of this software product become available, they may also be obtained by purchasing this option again.

If you prefer to receive automatic distribution of revised versions for this product, you must purchase a Software Product Service Agreement.

Software Revision Right-To-Copy Option

The Right-To-Copy Option allows a customer with multiple CPUs to copy a revised version of a software product from one CPU to another. Each CPU must be licensed for that product. You first install the revised software on one CPU; then you can make copies for additional CPUs by purchasing the Right-To-Copy Option for each additional CPU.

If you prefer to automatically obtain the right-to-copy, you must purchase a Service Right-to-Copy for each additional CPU; this is a service added to a Software Product Service Agreement.

Documentation-Only Option

You can obtain one copy of the basic documentation by purchasing the Documentation-Only Option.

Installation Service Option

Installation for DECnet/E will consist of the following:

- Verification that all components of DECnet/E have been received.
- Verification that the necessary versions of the RSTS/E software and documentation are available.
- Verification of the appropriate sysgen paramenters.

Note: Should a software specialist be required to modify the previously installed operating system parameters, a time and materials charge will apply.

- Create the necessary DECnet/E accounts and directories.
- Define and create a local node DECnet database.
- Install DECnet/E software
- Modify the system's start-up command procedure including starting up the DECnet/E network.
- Verify the proper installation of DECnet/E by running a series of tests to show connectivity (demonstrated by the use of the network installation procedure) to a designated node.

Connectivity to all other nodes within the network is the responsibility of the customer.

NETstart Services Options

NETstart Services help you "start-up" operation of your DECnet networking environment quickly by accelerating the learning process of your staff. It includes direct assistance, documentation review, discussion and hands-on experience provided on-site by a DIGITAL Networking Specialist. NETstart is designed to benefit first time users, as well as experienced network computer users.

There are two levels of NETstart Services. NETstart I is the most comprehensive start-up service, followed by NETstart II.

You should be experienced with your appropriate operating systems prior to scheduling these services. Contact your DIGITAL representative for more details on NETstart Services.

Software Product Service Agreements

DIGITAL offers licensed customers annual Software Product Service Agreements to maintain their software.

DECsupport Service is the most comprehensive level of service offering critical problem on-site assistance and scheduled preventative maintenance. You receive telephone support that gives you timely answers and solves most software problems. In addition, you get revised versions of the software and documentation, and system newsletters or dispatches.

BASIC Service is ideal for customers who have a staff whose experience and expertise enables them to analyze and communicate a software problem to DIGITAL remote support centers. You receive telephone support that gives you timely answers and solves most software problems. In addition, you get revised versions of the software and documentation, and system newsletters or dispatches.

Self-Maintenance Service is designed for customers who require revised versions of the software and documentation from DIGITAL. In addition, you get system newsletters or dispatches and may submit software performance questions.

A variety of service options may be added to an existing Software Product Service Agreement, such as service for multiple-like systems. Contact your DIGITAL representative for additional information and ordering details.

The Prerequisite Software, as specified by this SPD, must have the equivalent level Software Product Service.

For more information on what is included in these agreements, please obtain the appropriate Service Description from your local DIGITAL office.

Training From Educational Services

To ensure customer success with DIGITAL products, Educational Services sells training for the installation, maintenance and/or management of DIGITAL software. Course formats vary from seminars to packaged training materials that include self-paced instruction and computer-based instruction to traditional lecture/labs at DIGITAL's worldwide Training Centers.

For a complete listing of course schedules and prices, refer to the *DIGEST*, Educational Services' quarterly publication. For curriculum-specific information, training recommendations and assistance in planning training programs, please contact your Educational Services Representative.

Professional Software Services

DIGITAL Software Specialists are available on a per-call or resident contract basis to help in all phases of software development or implementation. Specialists are available to serve as technical consultants, decision support consultants or business systems analysts. Resources are available to:

- Supplement your programming staff
- Assume project management responsibility
- Develop software
- Augment a system start-up service package with tailored services to meet specific needs

Contact your DIGITAL representative for additional information and ordering details.

SOURCE MATERIALS OPTIONS

You can obtain optional source materials for this software product by signing DIGITAL's Software Program Sources License Agreement and then purchasing the source option(s) you want. The agreement entitles you to use the source materials at one customer facility or location which is specified in the agreement.

Most users do not require source materials. They are used primarily to make modifications to the software product. Source kits provided by DIGITAL do not necessarily contain all source files used by DIGITAL to build binary kits.

Source License and Sources Listings Option

This option provides you with listings of the source programs for this software product. It gives you the right to use the listings for any CPU at the facility/location specified in the agreement which has a Single-Use License for the object code.